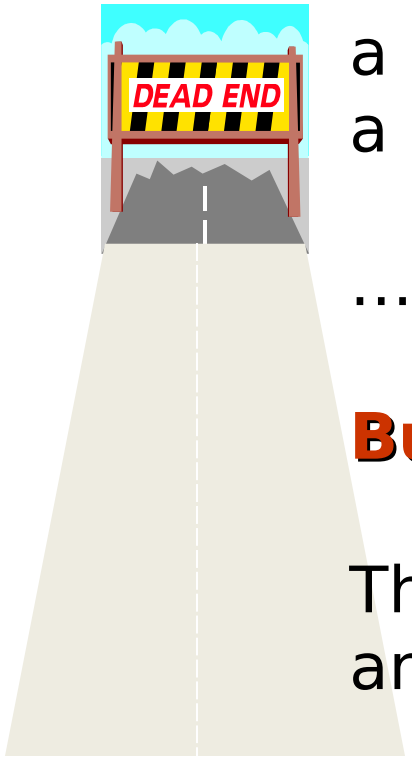
The Compelling Argument for Item Unique Identification for Accurate Maintenance Priorities

Jim Semerad, CDR, USN

Mike Howard

Supply Chain Management



Implementing RFID and IUID without a **Supply Chain Management System** is a dead end.

... no savings

But you would have met DoD requiremen

The trick is to find a way to implement RFID and IUID with a friendly SCM system.

...Here we are using COLTS

Shipping (Planned)

COLTS

Pick List

Warehouse

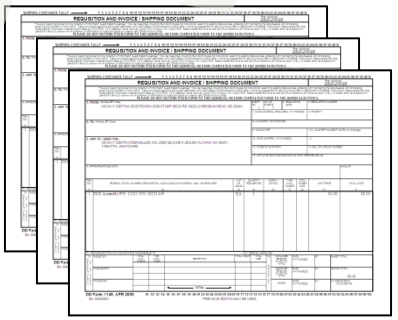
Warehouse person picks parts

Shipping

Parts are brought to shipping and either IUID scanned or RFID Scanned as a group

Handheld

COLTS



COLTS creates DD1149's for each shipment

Receiving Planned

Portal RFID
Tag reader

IUID or RFID handheld scan

Handheld

Receiving

Warehouse

COLTS

Warehouse person places received parts in inventory or maintenance

Handhelds

- USFF Goal is to have one handheld that can perform multiple functions
  - Working with SSC-A, SEA 04, SEA 08, OSD
  - Currently five handhelds in the mix:
    - CN3G
    - CN3E
    - CN4
    - CN4E
    - CK3
  - CN3E and G have been tested with ANSI, QCTS, BCS, and IBS
    - eFSM will be the next to test
  - Plan to be hardware non-specific

Shipyard and Maintenance Availabilities

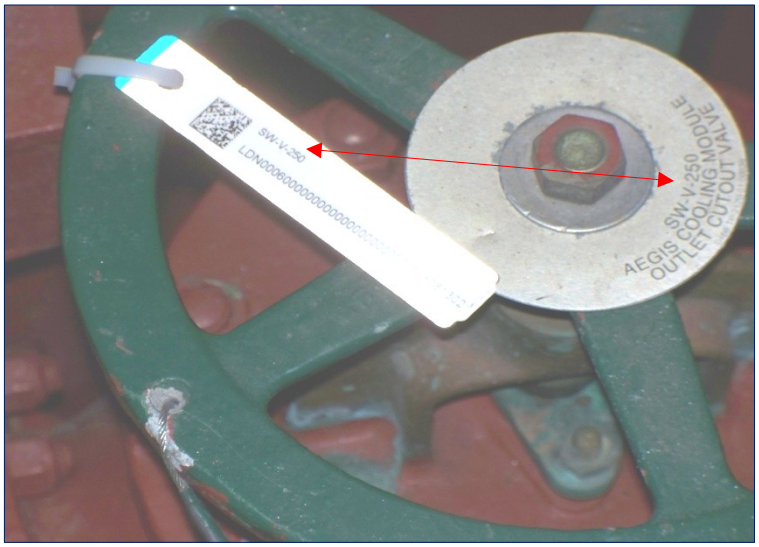
- Harsh Environment
  - Ability to reprint label
- Maintenance actions may remove label
  - Unit can provide a copy of the 2D Data Matrix to the shop for re-attachment after repairs if required
- Added maintenance burden
  - Simple application of adhesive tag on clean surface
  - Minimal effort required

Hanging IUID Labels (Ship)

Authorizing Officer

Label Being Hung

Shipboard Marking



Continued Efforts

- RIVGRUONE
  - Deployed MFOM and IUID software 8 Mar 2010
  - Deployed 5 CN3 handheld units with AWN MobileApp with QCTS interface
  - Training 8 – 9 Mar
  - Labeling effort 10 -11 Mar
    - Labeled – 385 pieces of equipment over 2 days
  - Model version 3.2 released 17 Mar with improved APL and CDM Data

USMC IUID Legacy Marking Approach

UID Candidates (Controlled Items: Class VII)

- ❑ Disposal Date (2011)
- ❑ OSD Criteria
- ❑ OEM Mark; per DFARS 211.274-1

Pedigree Data Collection

- ❑Total Force Structure Management System
- ❑Marine Corps Equipment Readiness Informati
- ❑Program Management Office
- ❑OSD Criteria
- ❑GCSS-MC Requirements
- ❑Financial Data

Engineering Analysis

- ❑ UID Label Placement
- ❑ UID Label Size, Material & Adhesive
- ❑ Marking Instructions

Mobile Marking Execution

- ❑ Deployment of Mobile Marking Teams
- ❑ Produce Labels
- ❑ Mark and Scan Equipment

Temporary Data Storage (TDS)

- ❑ OSD Registry
- ❑ GCSS- MC

UID Construct #2

17V4KAB72347HX32354

IAC CAGE Part No. Serial No.

SPAWARS Extremely High Frequency Satellite Program

Naval Extremely High Frequency Satellite Program (NESP)
UID/RFID Cost Analysis
Consulting Team: PEO C4I Consulting
In Cooperation with SPAWAR System Center Code 2622, Barry Jones

Without RFID and IUID:

Yearly Total Costs/Hours for Five Years

	Year 1	Year 2	Year 3	Year 4	Year 5	**Total**
Cost	$109,833.33	$109,833.33	$109,833.33	$109,833.33	$109,833.33	**$549,166.67**
Hours	2622	2622	2622	2622	2622	

With RFID and IUID:

Yearly Total Costs/Hours for Five Years

	Year 1	Year 2	Year 3	Year 4	Year 5	**Total**
Costs	$38,565.73	$23,035.73	$23,035.73	$23,035.73	$23,035.73	**$130,708.67**
Hours	450	450	450	450	450	

Avoidance:

Total Cost Avoidance

	Year 1	Year 2	Year 3	Year 4	Year 5	**Total**
Costs	$71,267.60	$86,797.60	$86,797.60	$86,797.60	$86,797.60	**$418,458.00**
Hours	2,172	2,172	2,172	2,172	2,172	

F-16
APG-68 PROGRAMMABLE SIGNAL PROCESSOR MEMORY CARDS

BUILD TO PRINT

- $14K - BUY
- $ 3K - REPAIR
- 500 HR MTBF
- SEVERE DMS PROBLEM

PERFORMANCE

- $ 4K - BUY
- $ 0 - REPAIR
- 40,000 HR MTBF*
- NO DMS PROBLEM
- DOUBLE MEMORY

Investment = $5.5M
Projected LCC Savings = $54.8M
ROI = 10.0

*Estimated

FMS AIM-120 Inventory

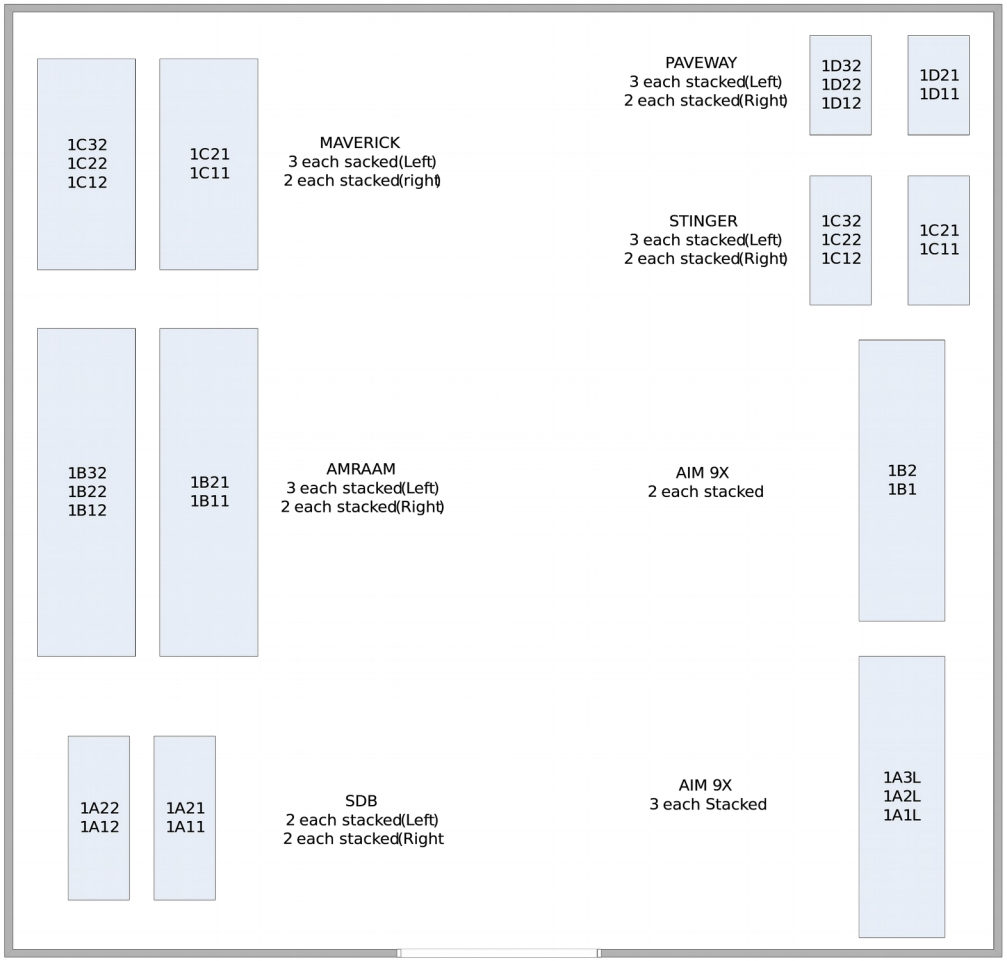
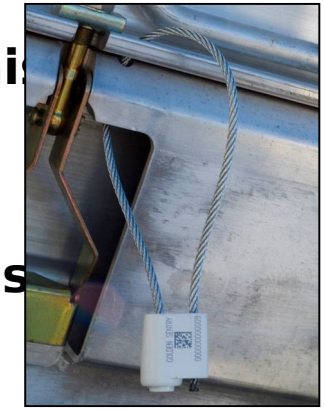


Figure 2
Simulated Bunker Layout

FMS AIM-120 Inventory

- **Demo 2A: Baseline Current Inventory Process**
  - **Location: Raytheon Missile Systems, Tucson**
  - **Simulated bunker, with 29 missile containers (Stinger, AMRAAM, AIM-9X, Paveway, Maverick, and SDB)**
  - **6 personnel, fork truck**
  - **Timed staging, inventory, re-stow**
    - **Total bunker 114 minutes**
    - **Average 236 seconds per containe**

- **Demo 2B: UID Inventory**
  - **Scan UID container seal which crosse container UID and missile UIDs.**
  - **Timed complete bunker inventory, start to fini**
    - **3 minutes, 50 seconds**
    - **Average 8 seconds per container**



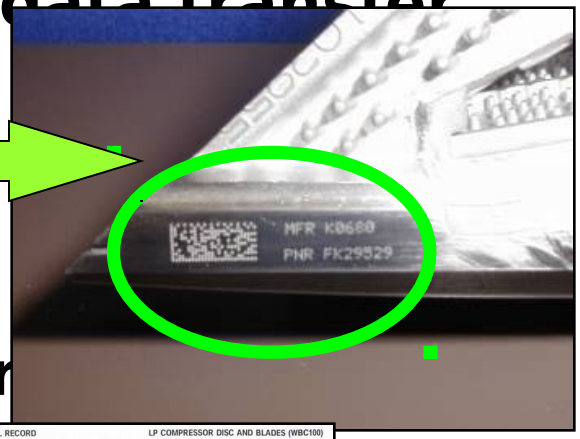
- **Will apply results to global universe of E-EUM mis**
  - **(>35,000) by country**

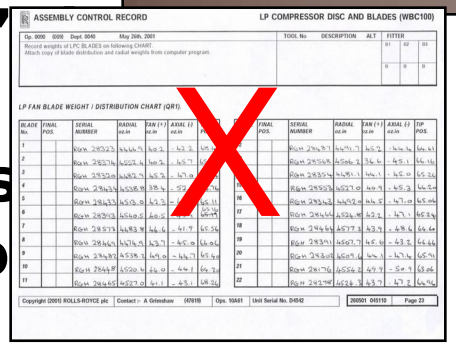
NDIA – Engine Manufacturer
Why IUID With Automated Data Capture?

- **100% Reduction – Quality Errors**
- **100% Reduction - Quality Escapes**
- **100% Reduction - Quality Notifications**
- **90% Reduction – Labor (cycle time)**
- **40 - 50% Reduction – Product Development Span Time**

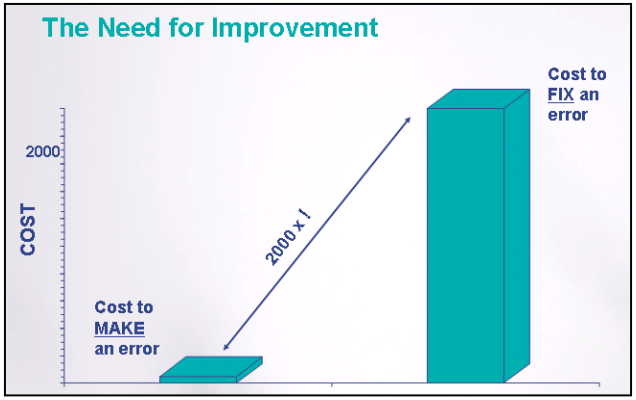
Benefits of IUID and Automated Data Capture

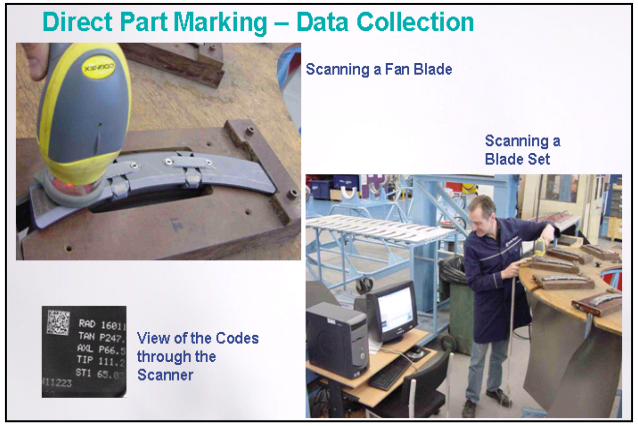
- **Significantly reduces risk of quality failure associated with identification escapes**
- **Eliminates legibility issues**
- **An enabler to a paperless system**
- **Improves speed and accuracy of data transfer**
- **No data transcript errors**
- **Internationally recogn**
- **Has the ABILITY to……..**
  - **Improve parts traceability**
  - **Reduce internal processing pr**
  - **Capture accurate ‘As Built’**
  - **Check ‘Should Build’ data**
  - **Reduce Replenishment cos**
  - **Generate electronic log bo**

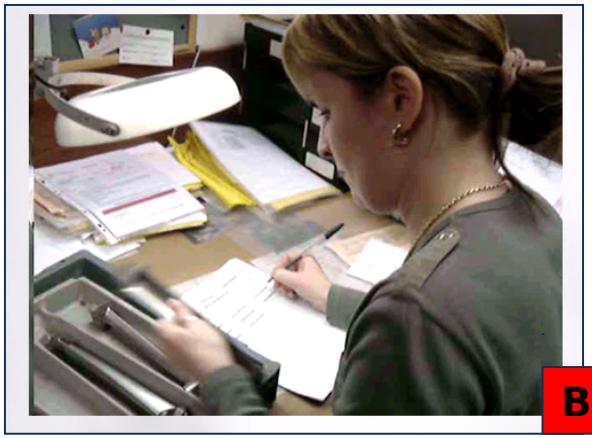




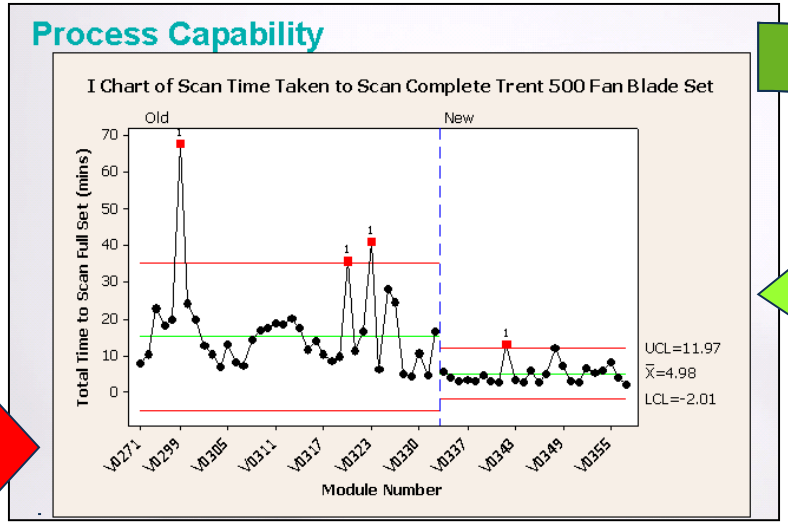
An IUID Journey - Sample







BEFORE



Provided Courtesy of Rolls Royce Engines : Nat Russhard Oct 2005

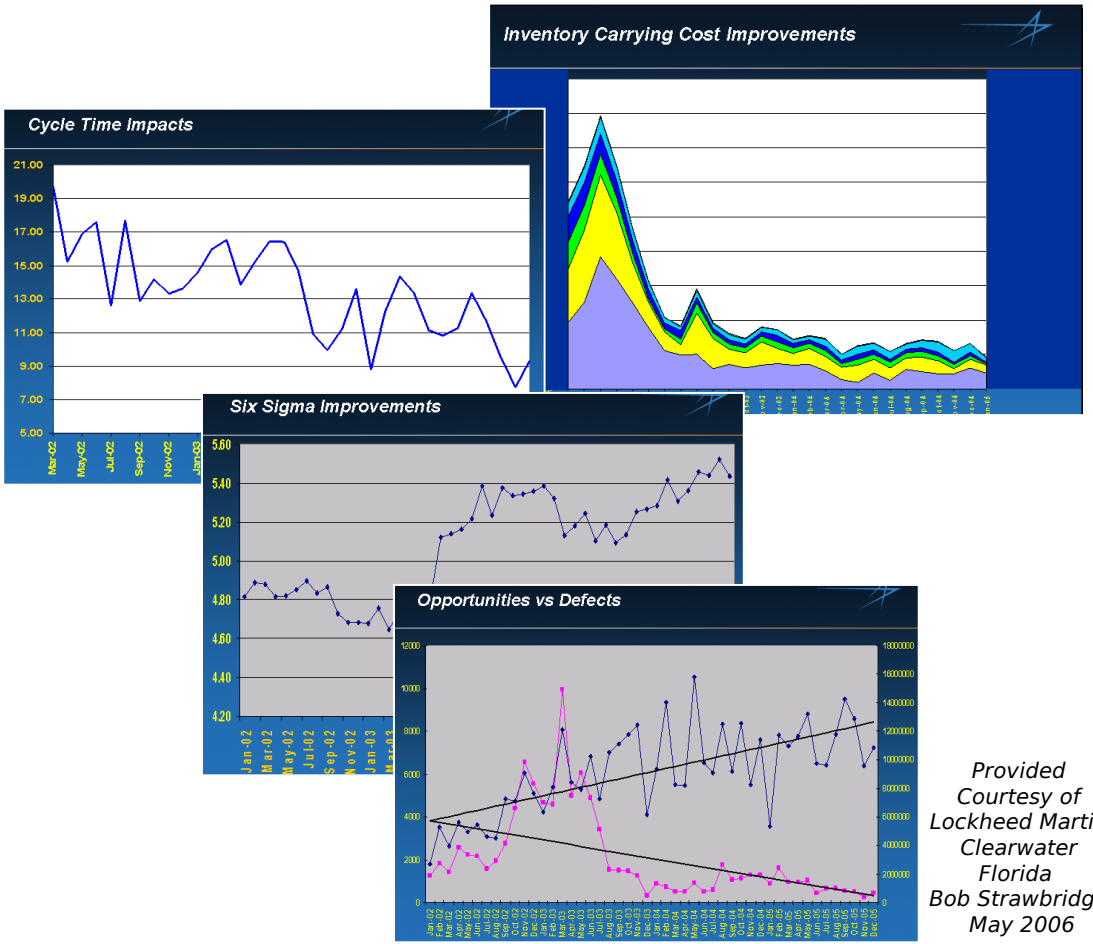
An IUID Journey - Sample

Paper Cell - Manual Transcription, Identification Errors, Inventory Costs

Solution - MRI With Automated Data Capture and Exchange

Transformation Began with BarCode 39 in 2000

- **40% Cycle Time Savings**
- **30% Inventory Reduction**
- **50% Reduction in Defects**
- **Initiated Transition to 2D Data Matrix**

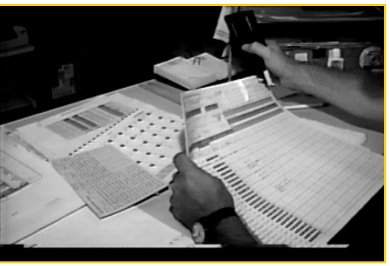


Provided Courtesy of Lockheed Martin Clearwater Florida Bob Strawbridge May 2006

An IUID Journey - Sample

Automated Transcription of Part Identification

Eliminated Part Identification Non-conformities



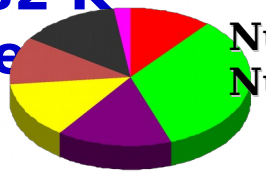
- **Standardized Marking Method**
- **Eliminated 115 M characters manually recorded**
- **Eliminated 382 K transcription e**

BEFORE

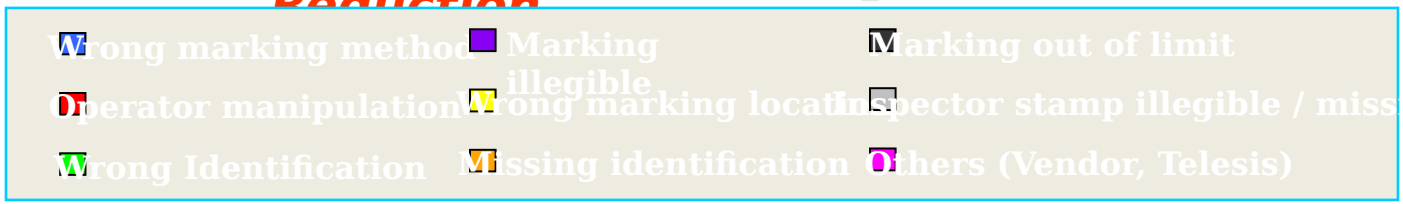
Number of Parts: 870
Number of QN: 160

AFTER

Number of Parts: 46
Number of QN: 25



Quality Notification Reduction



Provided Courtesy of Pratt & Whitney: Andy Jay Sept 2006

An MRI Success Journey

ELITE – PLCS – DEX Development (Completed)

- Application of ISO0303AP239 and follow on Phases of the Electronic Logistics Information Trading Exchange (ELITE) to include UID data interface to the Registry & additional Navy, CCAD data exchange along with the current Sikorsky and Army DA2410 System current XML data exchange. Includes funding to NAVAIR and Redstone for organic support. Production Follow-on Projects with NAVAIR and ARMY AV IMMC
- POC: Charlie Lord, UID PMO

Small Arms Marking at Anniston

- End to end integration of UID marking and AIS/AIT to Anniston Army Depot M-9 and M-240 product lines to evaluate economics of service based approach.
- POC: Mr. Mike Friedman PMSoldier

Standard Missile Marking and Serialized Item Management using UID as Enabler

- Integrate UID technology into Standard Missile's Advanced maintenance Information System and perform real time SIM using UID technology
- POC: Mr. Craig MacDougall, NSWC Corona

Gage UID Pilot Project

- Integrate USMC's Gage PM initiative to apply UII to all gages with NSWC Coronas Advanced Management Information System for support gage SIM

The Compelling Argument for Item Unique Identification for Accurate Maintenance Priorities

Questions ?

IUID Large Scale Demo

Installed, Not Live Live

Class	Ship	Training	Go Live	Remarks
SSN	USS NEW HAMPSHIRE	Aug 09		Awaiting Tag Test Results
DDG	USS FORREST SHERMAN	06 Apr 09	13 Apr 09	
FFG	USS HAWES	09 Mar 09	16 Mar 09	
CG	USS VELLA GULF	May 09	13 Jul 09	
LPD	USS MESA VERDE	16 Feb 09	23 Feb 09	
LPD	USS PONCE	23 Mar 09	01 Apr 09	
SSBN	USS TENNESSEE	May 09		Awaiting Tag Test Results
PC	USS HURRICANE	04 May 09	04 May 09	
MCM	USS CHIEF	11 May 09	22 Jun 09	
CVN	USS NIMITZ	04 May 09	06 May 09	Awaiting new TYCOM nomination
DDG	USS MASON	06 Jul 09	06 Jul 09	
LCS	USS INDEPENDENCE	17 Dec 09	17 Dec 09	
LCS	USS FREEDOM	18 Jun 09	18 Jun 09	
LHD	USS KEARSARGE	06 Apr 09	13 Apr 09	
DDG	USS RUSSELL	27 Apr 09	27 Apr 09	
LSD	USS WHIDBEY ISLAND	11 May 09	15 Jun 09	

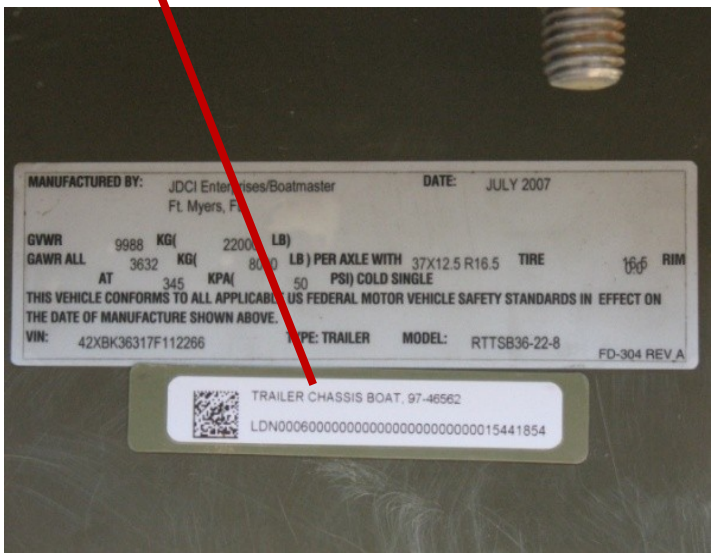
IUID Report Findings Highlights

- 100% of 2D barcodes scanned were accepted as unique IUIDs by the National IUID Registry
- The CN3G scanner -100% accurate in reading and displaying 2D barcode data
- The IUID 2D printer used for this shipboard demonstration experienced multiple errors ~90% reliable
- A total of 1013 IUID 2D tags were hung
  - 30% of available equipment tagged
  - 100% inspected
    - All in place, readable and in good to excellent condition.
    - No tags were painted over, torn, or displayed signs of wear.

RIVGRU One

HMMWV: Cab, Differential (Front/Rear)

RIVGRU One


MANUFACTURED BY:
DATE: JULY 2007
GVWR 9988 KG(2200 LB)
GAWR ALL 3632 KG(800 LB) PER AXLE WITH 37X12.5 R16.5 TIRE 16.5 RIM
AT 345 KPA(50 PSI) COLD SINGLE
THIS VEHICLE CONFORMS TO ALL APPLICABLE US FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
VIN: 42XBK36317F112266
TYPE: TRAILER
MODEL: RTTSB36-22-8
FD-304 REV.A
TRAILER CHASSIS BOAT; 97-46562
LDN000600000000000000000000000015441854

RPB: Trailer, Boat, Engines

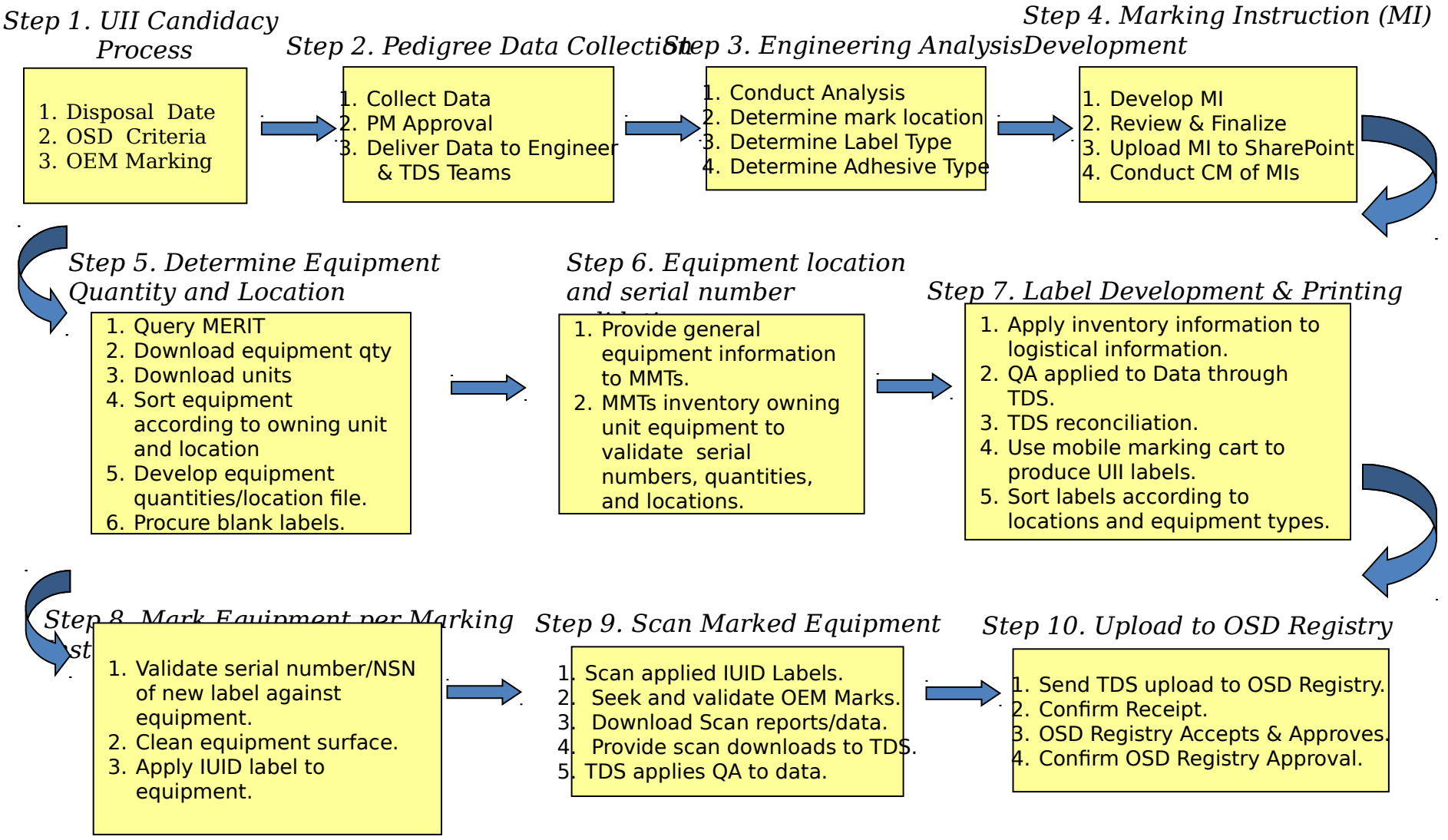
IUID Benefits

- Increased ability to track turn in & rotable pool items
- Increased accuracy of shipboard equipment configuration documentation
  - Improves logistics support
  - Increased accuracy of the MFOM readiness reporting models
- Improved material readiness
  - Material history retained for life of component
  - Improved insight into the cause-and-effect relationship between resources and readiness
    - Life cycle costs reduced by installing better suited components
  - Enables serialized item management (SIM)

Opportunistic Marking for Legacy Equipment

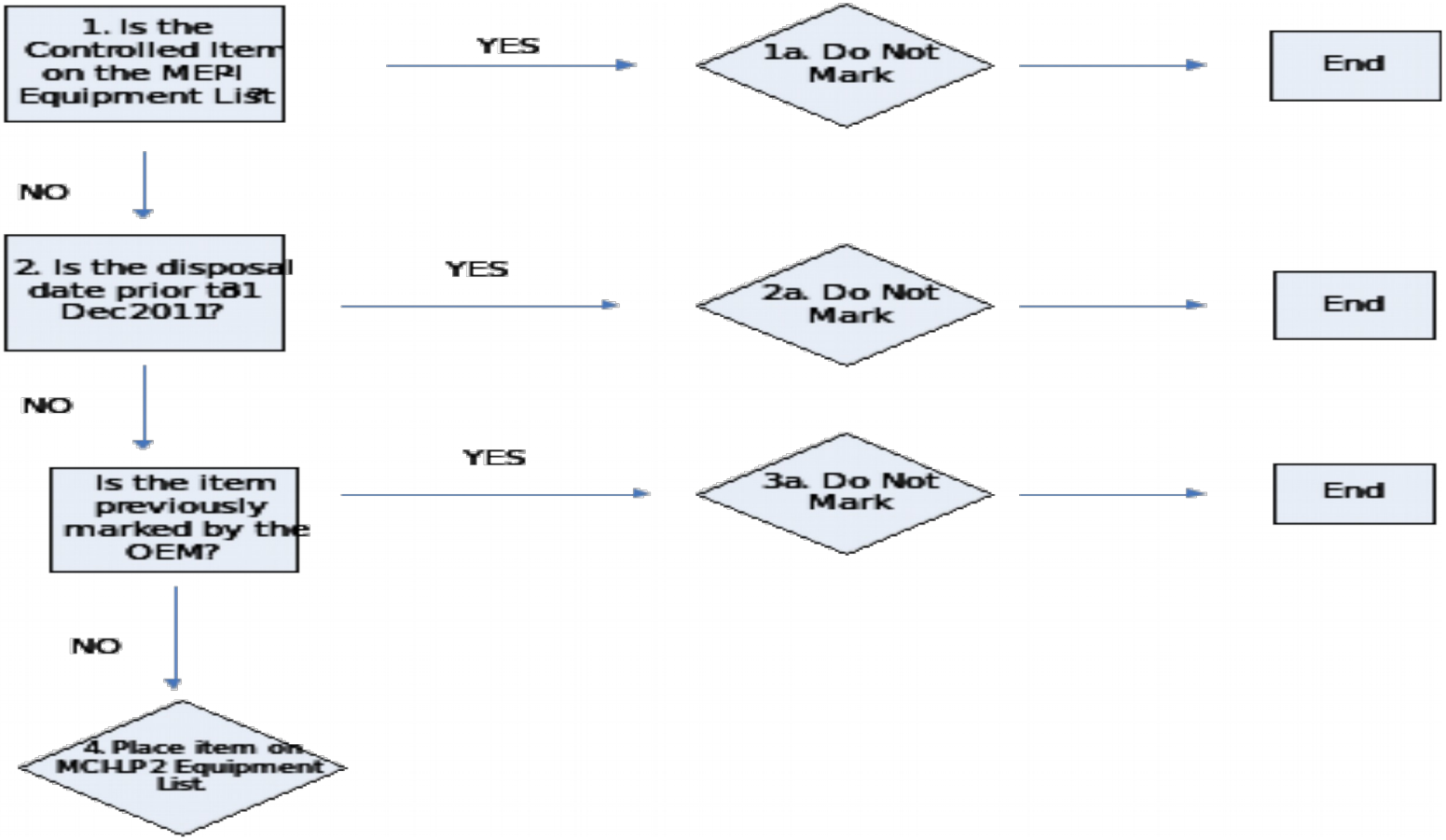
- Marking during normal routine operations
  - Example
    - Maintenance both corrective and preventive
    - Integrated Logistics Overhaul (storeroom cleanout)
- Lower cost
  - Common marking equipment/materials
  - Reduced training
  - Maintenance technician already performing a similar function
    - Similar to isolating equipment
- Non-Invasive
  - Durable
  - Minimal process change required

USMC IUID Legacy Marking Process


Step 1. UII Candidacy Process
1. Disposal Date
2. OSD Criteria
3. OEM Marking
Step 2. Pedigree Data Collection
1. Collect Data
2. PM Approval
3. Deliver Data to Engineer & TDS Teams
Step 3. Engineering Analysis
1. Conduct Analysis
2. Determine mark location
3. Determine Label Type
4. Determine Adhesive Type
Step 4. Marking Instruction (MI) Development
1. Develop MI
2. Review & Finalize
3. Upload MI to SharePoint
4. Conduct CM of MIs
Step 5. Determine Equipment Quantity and Location
1. Query MERIT
2. Download equipment qty
3. Download units
4. Sort equipment according to owning unit and location
5. Develop equipment quantities/location file.
6. Procure blank labels.
Step 6. Equipment location and serial number
1. Provide general equipment information to MMTs.
2. MMTs inventory owning unit equipment to validate serial numbers, quantities, and locations.
Step 7. Label Development & Printing
1. Apply inventory information to logistical information.
2. QA applied to Data through TDS.
3. TDS reconciliation.
4. Use mobile marking cart to produce UII labels.
5. Sort labels according to locations and equipment types.
Step 8. Mark Equipment per Marking
1. Validate serial number/NSN of new label against equipment.
2. Clean equipment surface.
3. Apply IUID label to equipment.
Step 9. Scan Marked Equipment
1. Scan applied IUID Labels.
2. Seek and validate OEM Marks.
3. Download Scan reports/data.
4. Provide scan downloads to TDS.
5. TDS applies QA to data.
Step 10. Upload to OSD Registry
1. Send TDS upload to OSD Registry.
2. Confirm Receipt.
3. OSD Registry Accepts & Approves.
4. Confirm OSD Registry Approval.

USMC IUID Legacy Marking Candidacy

IUID Candidacy Process Developed



Primary focus of Mobile Marking Execution: Class VII (PEIs)

USMC IUID Temporary Data Storage

Input Operations

- Accept IUID XML Data
  - Program Managers
  - Parallel or Previous Marking Efforts
  - All On-going Legacy Marking Efforts within Marine Corps
- Legacy Data Collection
  - 58 Data Elements Signed off by HQMC
- USMC Marking Effort Scan Reports
  - Aligns Scans with Legacy Data Collected

TDS Functionality

- Based on OSD IUID Registry
  - Business Use Cases
  - Data Validation Rules
  - Data Elements Required for Registration
- Synchronizes Registration of IUID Legacy Data with OSD Registry
- Ensures Uniqueness and Proper Construct of UIIs
- Synchronizes UIIs with Legacy Data

The USMC Temporary Data Storage Will House Data Until Global Combat Support System – Marine Corps (GCSS-MC) Is Capable Of Performing This Function, At Which Time Data Will Be Migrated.

Output Operations

- Matrix Reporting by TAMCN, NSN, Part Number, or Product Ownership
- XML IUID Data Registration to OSD IUID Registry
- USMC Legacy Marking Effort Performance